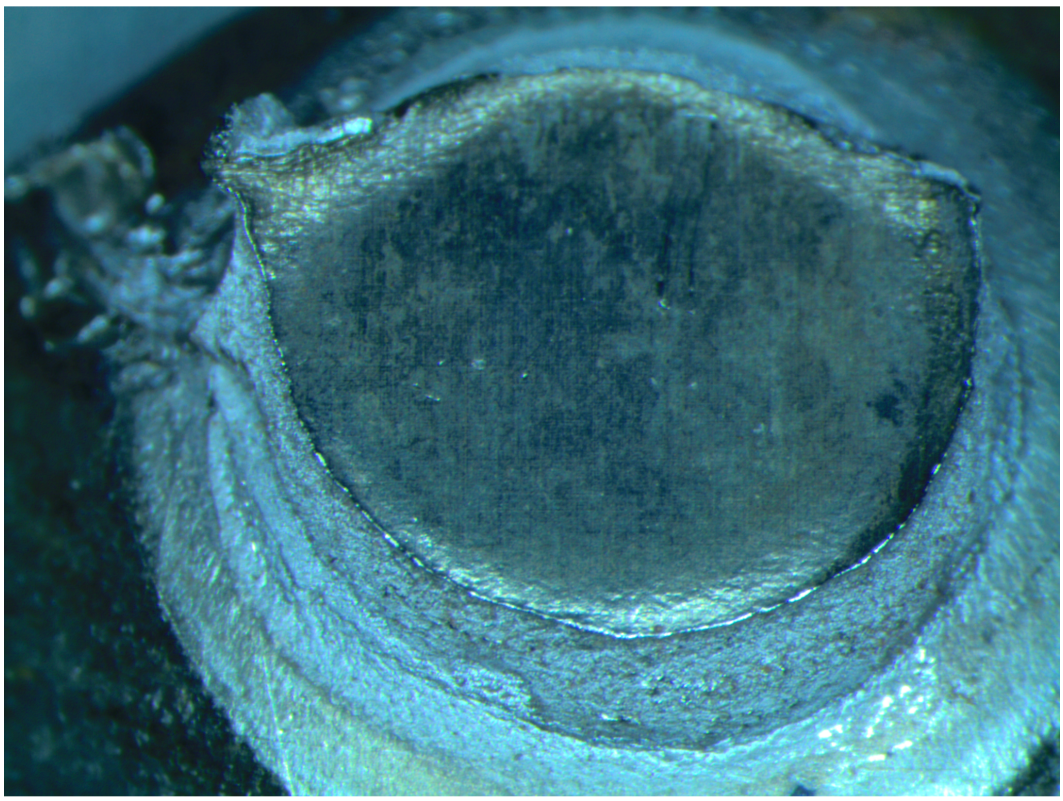
Electrical Resistance Spot Welding

Advance Processing Analysis



Nachimani Charde

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Preface

Some mechanical engineers and scientists struggle to understand electrical resistance spot welding (RSW) fundamentals because they are unfamiliar with the electrical engineering principles involved in spot welding processes. This book serves as a guide for them to understand it through the perspective of electrical engineering, although the book contains mechanical engineering explanations. Fellow researchers believe that in spot welding, the heating process ($Q=I^2Rt$) is related to current, resistance, and time, although it differs to some extent when dealing with alternating current (AC) versus direct current (DC) sources. I have clearly derived the heating equation for the AC waveform from the DC waveform. The post-crack propagation mode is introduced for the tensile test with the tensile force versus displacement calculation. Also, introduced the electrically generated forging forces to scrutinize the force profiles. Shunting resistance calculation was another problem, but I solved it using the dynamic resistance which were obtained from the root mean square voltage and current values. As a matter of fact, when I began my doctoral studies, there was no comprehensive instruction available for RSW technology, so I wrote this book over a decade, which covers everything from the fundamentals to some advanced techniques. Fellow researchers may argue that combining diverse materials constitutes the entire area of resistance spot welding. I don't refute it, but I don't completely accept it because in resistance spot welding, processing is more important to achieve the best results than joining various materials with inconsistencies. This book emphasizes the processing part over the simulation and various material science explorations. Maybe book two will focus on various materials pertaining to processing aspects but not this one.

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